## AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A magnetic sensor comprising a giant magnetoresistive effect element having a spin valve film including a pinned layer, a conductive spacer layer, and a free layer comprising:

a bias magnet film composed of a permanent magnet for producing a bias magnetic field in the free layer in a predetermined direction so that the direction of magnetization in each magnetic domain in the free layer can be maintained in the predetermined initial state direction; and

an initializing coil that is provided in the vicinity of the free layer and applies to the free layer [[a]] an initializing magnetic field in the direction same as the direction of the bias magnetic field by being energized under a predetermined condition so that the direction of magnetization in each magnetic domain in the free layer can assuredly be returned to initial state direction even if the direction of magnetization is disturbed by applying a strong magnetic field to the free layer.

2. (Withdrawn) A production process of a magnetic sensor comprising, on a substrate, a pinned layer, a free layer and a bias magnet film being a permanent magnet that applies a bias magnetic field to the free layer to form a magnetoresistive effect element having a resistance value varying according to a relative angle made by a direction of magnetization in the pinned layer and a direction of magnetization in the free layer, comprising:

a step of preparing a magnet array configured such that plural permanent magnets are arranged on a lattice point of a tetragonal lattice and a

polarity of a magnet pole of each permanent magnet is different from a polarity of the other adjacent magnet pole spaced by the shortest route;

a step of manufacturing a wafer, including the substrates, on which plural island-like element films are interspersed, each element film including a film that becomes the pinned layer, a film that becomes the free layer and a film that becomes the bias magnet film; and

a step of disposing the wafer in the vicinity of the magnet array so as to establish a predetermined relative positional relationship between the wafer and the magnet array, whereby the film that becomes the bias magnet film of the plural element films is magnetized by utilizing a magnetic field formed between one magnet pole of the magnet poles of the magnet array and other magnet pole, of the magnet poles of the magnet array, that is adjacent to the one magnet pole spaced by the shortest route.

3. (Withdrawn) A production process of the magnetic sensor claimed in Claim 2, wherein

the step of manufacturing the wafer includes a step of forming each film, that becomes the free layer, of the plural element films in such a manner as to have a shape with a long axis and a short axis, and in such a manner that at least one of the long axes of the films that become the free layers of the plural element films is perpendicular to the long axis of the other film, that becomes the free layer, of the plural element films and a step of forming the film that becomes the bias magnet film at both ends of each film that becomes the free layer, in the direction of the long axis,

and wherein the predetermined relative positional relationship in the step of magnetizing the film that becomes the bias magnet film is a relative positional relationship, between the wafer and the magnet array, that matches the direction of magnetization of the film that becomes the bias magnet film with the direction of the long axis of the film that becomes the free layer having the bias magnet film provided at both ends thereof, by a magnetic field formed by the magnet array.

4. (Withdrawn) A production process of the magnet sensor claimed in Claim 3, further comprising

a step of arranging the wafer in the vicinity of the magnet array so as to establish a relative positional relationship, between the wafer and the magnet array, that is different from the predetermined relative positional relationship, whereby the direction of magnetization of the film, that becomes the pinned layer, of the plural element films is pinned by utilizing the magnetic field formed by the magnet array.

5. (Withdrawn) A magnet array including plural permanent magnets, each having an approximately rectangular parallelepiped shape and having a sectional shape, perpendicular to one central axis of the rectangular parallelepiped, which is approximately square, and each having poles formed at both edge faces, one of which has the approximately square shape perpendicular to the central axis of the rectangular parallelepiped; wherein

the plural permanent magnets are arranged in such a manner that each center of gravity of the edge faces having the approximately square shape is matched with a lattice point of a tetragonal lattice, a certain side of sides forming one of the

edge faces of the plural permanent magnets disposed in a certain row of the tetragonal lattice and a certain side of sides forming one of the edge faces of the other plural permanent magnets disposed in the same row of the tetragonal lattice is in a same straight line, all the edge faces having the square shapes of the permanent magnets are placed in an approximately same single plane, and any two of the polarities of the magnetic poles of the permanent magnets disposed adjacent each other and spaced by the shortest route are different each other.

6. (Withdrawn) A magnet array including plural permanent magnets, each having an approximately rectangular parallelepiped shape and having a sectional shape, perpendicular to one central axis of the rectangular parallelepiped, which is approximately square, and each having poles formed at both edge faces, one of which has the approximately square shape perpendicular to the central axis of the rectangular parallelepiped and a thin plate-like yoke formed of a magnetic material; wherein

the plural permanent magnets are arranged in such a manner that each center of gravity of the edge faces having the approximately square shape is matched with a lattice point of a tetragonal lattice, a certain side of sides forming one of the edge faces of the plural permanent magnets disposed in a certain row of the tetragonal lattice and a certain side of sides forming one of the edge faces of the other plural permanent magnets disposed in the same row of the tetragonal lattice is in a same straight line, all the edge faces having the square shapes of the permanent magnets are placed in an approximately same single plane, and any two of the

polarities of the magnetic poles of the permanent magnets disposed adjacent each other and spaced by the shortest route are different each other; and

the yoke comprises plural through holes each of which has a shape which is the approximately same as the sectional shape which is approximately square and the holes being arranged at the positions where the permanent magnets are disposed, and the yoke being arranged in such a manner that the same single plane in which all the edge faces of the permanent magnets are placed is disposed between an upper surface and a lower surface of the yoke when the permanent magnets are inserted into the through holes.

7. (Withdrawn) A magnet array claimed in Claim 6; wherein

the yoke has through openings serving as air gaps formed between the through holes that are adjacent each other and that are spaced by a shortest route.

8. (Withdrawn) A magnet array claimed in Claim 7; wherein

the yoke has openings at regions each of which is surrounding a center of gravity of a square drawn by lines connecting the lattice points of the tetragonal lattice in a plan view.

9. (Withdrawn) A magnet array claimed in any one of claims 6 to 8; wherein

each of the through holes of the yoke has a square portion having a square shape which is the approximately same as the shape of the sectional square shape of the permanent magnet in a plan view and a margin portions swelling outwardly from the square at each of corners of the square portion.

10. (New) A magnetic sensor according to Claim 1, wherein

said spin valve film of the giant magnetostatic effect element has a longitudinal direction; and

said bias magnet gives a constant bias magnetic field to the free layer in the longitudinal direction of the free layer in order to maintain uniaxial anisotropy of the free layer.

11. (New) A magnetic sensor according to Claim 10, comprising:

a plurality of narrow zonal portions made of the spin valve film; and

a plurality of the bias magnet films,

wherein, each of the narrow zonal portions extends in the predetermined direction on the upper surface of each of the bias magnet films and joins to the adjacent narrow zonal portion so as to magnetically join to each of the bias magnet films at the upper surface of each of the bias magnet films.

12. (New) A magnetic sensor comprising a giant magnetoresistive effect element having a spin valve film including a pinned layer, a conductive spacer layer and a free layer, the spin valve film having narrow zonal portions each of which extends in the longitudinal direction, comprising:

bias magnet films provided at both ends of the free layer in the longitudinal direction for producing in the free layer a bias magnetic field in the longitudinal direction of the free layer, whereby the direction of magnetization in each magnet domain in the free layer can stably be maintained in the predetermined direction when an external magnetic field is not present; and

initializing coils being energized under a predetermined condition to thereby generate an initializing magnetic field for returning the direction of magnetization in each magnetic domain in the free layer to the longitudinal direction of the free layer, whereby the direction of magnetization in each magnetic domain in the free layer can assuredly be returned to the initial state even if the direction of magnetization is disturbed by applying a strong magnetic field to the free layer.

13. (New) A magnetic sensor comprising a plurality of full-bridge-connected giant magnetoresistive effect elements, each giant magnetoresistive effect element having a spin valve film including a pinned layer, a conductive spacer layer, and a free layer.

14. (New) The magnetic sensor of claim 13, wherein there are four giant magnetoresistive effect elements, the full bridge connection comprising:

a first connection point between a first giant magnetoresistive effect element and a fourth giant magnetoresistive effect element;

a second connection point between a second giant magnetoresistive effect element and a third giant magnetoresistive effect element;

a third connection point between the first giant magnetoresistive effect element and the third giant magnetoresistive effect element; and

a forth connection point between the fourth giant magnetoresistive effect element and the second giant magnetoresistive effect element

wherein a sensor output is taken between the third connection point and the forth connection point.

15. (New) The spin valve films of claim 13 having narrow zonal portions each of which extends in the longitudinal direction comprising:

bias magnet films provided at both ends of the free layer in the longitudinal direction for producing in the free layer a bias magnetic field in the longitudinal direction of the free layer, whereby the direction of magnetization in each magnet domain in the free layer can stably be maintained in the predetermined direction when an external magnetic field is not present; and

initializing coils being energized under a predetermined condition to thereby generate an initializing magnetic field for returning the direction of magnetization in each magnetic domain in the free layer to the longitudinal direction of the free layer, whereby the direction of magnetization in each magnetic domain in the free layer can assuredly be returned to the initial state even in the direction of magnetization is disturbed by applying a strong magnetic field to the free layer.

16. (New) The free layer of claim 13 comprising:

a bias magnet film composed of a permanent magnet for producing a bias magnetic field in the free layer in a predetermined direction so that the direction of magnetization in each magnetic domain in the free layer can be maintained in the predetermined initial state direction; and

an initializing coil that is provided in the vicinity of the free layer and applies to the free layer an initializing magnetic field in the direction same as the direction

of the bias magnetic field by being energized under a predetermined condition so that the direction of magnetization in each magnetic domain in the free layer can assuredly be returned to initial state direction even if the direction of magnetization is disturbed by applying a strong magnetic field to the free layer.